Practical use of Milk Recording Information

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Abstract

The paper deals with the value of phenotypic information obtained from participation in milk recording. Examples are presented of how somatic cell counts are used for benchmarking the herd health and where management interventions are needed to ensure sustainable profit.

Keywords: benchmarking, dairy management, production, somatic cell score, udder health

Introduction

Traditional use of milk recording data has mainly been linked to the identification of suitable selection candidates. The development of methodologies to increase the reliability of genetic merit predictions is well known and has been well documented. Recent developments include, among others, the enhancement of mixed model methodologies to include molecular genetic information and comprehensive selection indices based on the variance and co-variance structures in combination with economic factors contributing to the profitability of dairy production.

The move from the use of phenotypes, in one from or the other, to genetic merit was logical in terms of identifying and ranking potential selection candidates. Refinement of usage of phenotypes, for management decisions, has however opened new possibilities. Principally variation in the observed phenotypes (V_P) is the result of variation caused by differences in the additive (V_A) and other (V_D, V_I) genetic differences amongst recorded animals, as well as the variation caused by a combination of management and other environmental influences (V_E) and specific animal responses to them (V_{GE}). Given the fitting of sophisticated prediction models to separate the useful components, this paper will deal with the use of either the variation observed in the phenotypic values or the non-genetic components contributing to such variation. For all practical reasons, V_P can be used for the purposes of accessing the role of management decisions in dairy enterprises.

Recordings of properties and traits contributing towards differences in sustainable profitability in dairy herds

Beyond animal information (matings, births, ownership, etc.) recordings useful in dairy cattle include milk production (kg milk per day), milk solids (percentage protein and fat), somatic cells per millilitre and, in cases, milk urea nitrogen (MUN). Given these traits and properties are recorded, seed stock producers or owners of selection candidates also allow functional

trait assessment. Technological advances and automation also allows for novel traits and properties to be recorded. The development and construction of genetic selection indices, based on the additive genetic variances and co-variances within a certain set of economic factors contributing towards profit and loss, serve as good indicators to consider variation in performance for the same properties to adapt management practices to ensure optimum performance.

Measurement against biological and economic norms and benchmarking

A definition of benchmarking is "the process of comparing business processes to industry bests and best practices". The objective is therefore to identify these best practices and to measure own practices against them. For any dairy production unit, such practices will result in animal performance that can be benchmarked against other herds (or groups of herds), own herd performance over time and/or known and acceptable biological, or even economical norms. Lately norms also include best practices for animal welfare and sustainable environmental viability.

Recording should directly contribute towards database information useful for benchmarking. In turn, reports emanating from this information should be accurate, timely and clear so that preventative and remedial actions can be taken. Although production and other animal performance levels will be dictated by resource and other constraints, clear (achievable) goals should be set, strived for, and monitored continually. Practical benchmarking should therefore be focussed on comparisons within similar or known environmental constraints and production system practices.

As mentioned, the first benchmark types relate to measuring against biological, economical and best practice norms. Examples of these benchmarks are average days in milk for lactating cows, percentage of milk samples (cows) within certain somatic cell count levels (eg. less than 100 000, 100 000 to 200 000, etc.), proportion of milk samples with MUN levels outside minimum and maximum norms for optimal feeding of protein and the ratio of nitrogen to energy in the diet, etc.

Another type of benchmark relates the recording in the herd compared to those of other herds with similar management practices, farming with the same breed and/or in the same region. This enables the manager of a dairy herd to look into and apply management interventions to ensure levels of performance or measurements that is achievable by fellow dairy producers.

Reporting, a few examples.

Figure 1 gives an example of a combination of benchmarking a Holstein herd against acceptable somatic cell count norms to ensure optimal herd health, while at the same time comparing the herd with other Holstein herds in the same region.

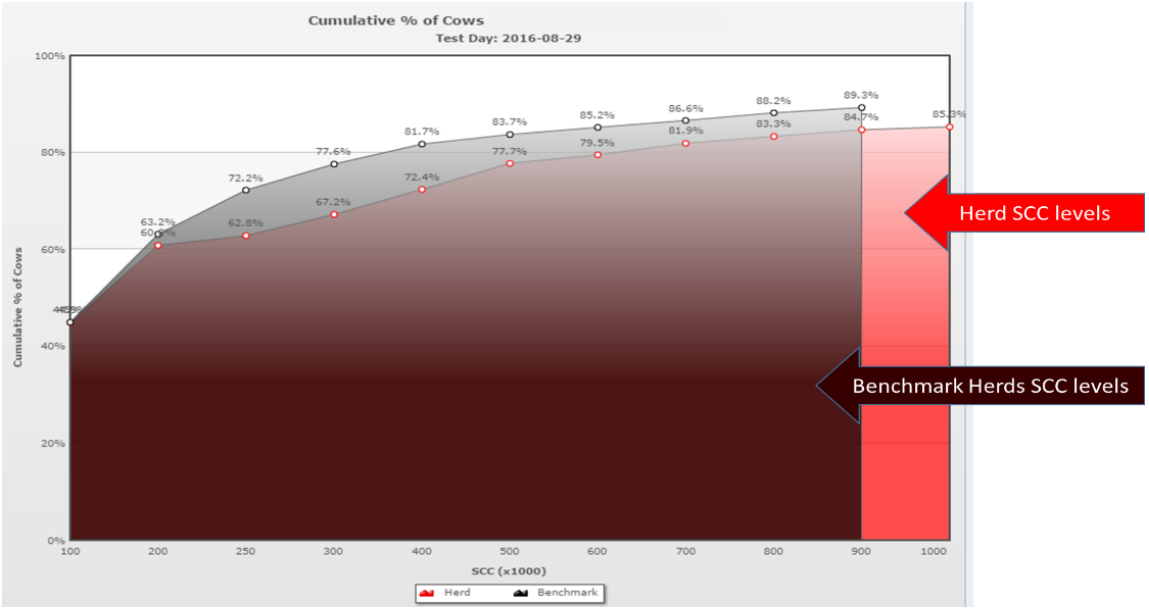

Figure 1: *Cumulative percentage of cows with Somatic Cell Counts per ml milk in a Holstein herd in comparison with other herds used as a benchmark.*

Both the herd and the benchmark herds' SCC levels are unacceptably high as the norms dictate that at least 65% of cows in lactation should have SCC values less than 100 000 and 80% less than 200 000.

Figure 2 depicts a Jersey herd with approximately 800 cows in milk benchmarking itself against the same norms but over a time period of one year.

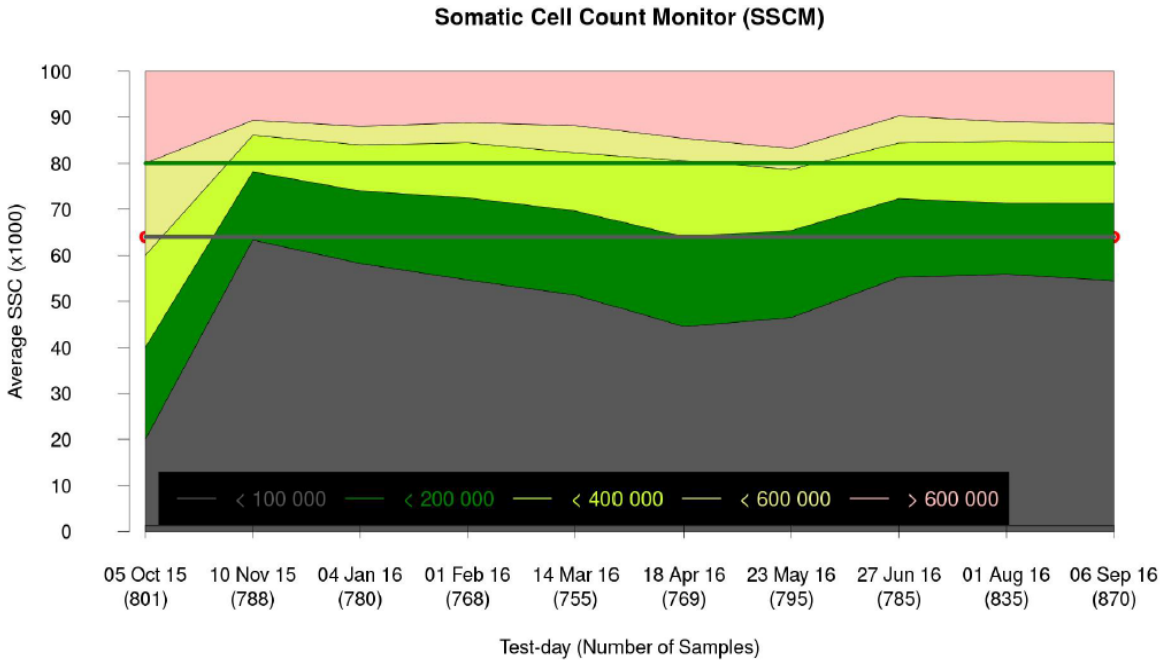

Figure 2: *Percentage of cows in a Jersey herd with somatic cell counts in intervals of 100 000 cells per ml over a year period.*

The SCC values depicted for the herd in Figure 2 shows that the herd struggles to maintain acceptable levels for SCC. In only one case (the test day in November 2015) were these values according to the acceptable benchmark levels.

Table 1 gives a detailed account of the impact of the SCC in the Jersey herd depicted in Figure 2.

Table 1: *SCC distribution and milk production loss monitored in a Jersey herd.*

SSC Levels	< 100k	100k - 200k	200k - 500k	500k - 800k	800k - 1 500k	> 1 500k
Number Cows	401	148	128	34	36	33
% Cows	51.4 %	19.0 %	16.4 %	4.4 %	4.6 %	4.2 %
Milk Quality	Excellent	Very Good	Needs Improvement	Poor	Serious	BAD
% Milk Loss	< 2 %	2 - 4 %	4 - 8 %	8 - 10 %	10 - 35 %	> 35 %
% Quarters Infected	< 1 %	1 - 6 %	6 - 16 %	16 - 26 %	26 - 48 %	> 48 %

Levels of SCC in the herd depicted in Figure 2 and Table 1 will lead to an average milk loss of between 4% and 8% due to cases of clinical mastitis among the cows.

Concluding remarks

Only one condition or property, namely Somatic Cell Counts per ml of milk, was used to illustrate the value of using phenotypic recording for management interventions to ensure the sustainable profitability in dairy herds. Other important properties emanating from milk recording participation have similar value. These, among others, include the trend in the drop of protein percentage against days in milk to depict the energy balance of the cows, the ratio of butterfat to protein in the milk to depict risks for acidosis and ketosis, differences in lactose levels in milk, with other indicators, to indicate stress levels of groups of cows, and other indicators. The value of the milk sample is increasingly more important for dairy farmers to ensure long term economic survival.

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